

SEQUENCE LISTING

<110> Branch, Andrea D.
Walewski, Jose L.
Stump, DeCherd D.

<120> NOVEL HEPATITIS C VIRUS PEPTIDES AND USES THEREOF

<130> RII-003CPUSCN

<150> US 09/719277

<151> 2001-04-13

<150> US 60/088670

<151> 1998-06-09

<150> US 60/089138

<151> 1998-06-11

<150> PCT/US99/12929

<151> 1999-06-09

<160> 17

<170> PatentIn Ver. 2.0

<210> 1

<211> 595

<212> DNA

<213> Hepatitis C virus

<400> 1

```
gcacgaatcc taaacctcaa agaaaaacca aacgtaacac caaccgtcgc ccacaggacg 60
tcaagttccc ggggtggcggg cagatcgttg gtggagtta cttgttgccg cgcaggggcc 120
ctagattggg tgtgcgcgcg acgaggaaga cttccgagcg gtcgcaacct cgaggtagac 180
gtcagcctat ccccaaggca cgtcggcccc agggcaggac ctgggctcag cccgggtacc 240
cttggccctt ctatggcaat gaggggttgcg ggtgggcggg atggctcctg tctccccgtg 300
gctctcggcc tagctggggc cccacagacc cccggcgtag gtcgcgcaat ttgggtaagg 360
tcatcgatac ccttacgtgc ggcttcgccg acctcatggg gtacataacc ctcgtcggcg 420
cccctcttgg aggcgctgcc agggccctgg cgcattggcg ccgggttctg gaagacggcg 480
tgaactatgc aacagggaac cttcctgggt gctctttctc tatcttctt ctggccctgc 540
tctcttgctt gactgtgccc gcttcagcct accaagtgcg caattcctcg gggct 595
```

<210> 2

<211> 196

<212> PRT

<213> Hepatitis C virus

<400> 2

```
Ala Arg Ile Leu Asn Leu Lys Glu Lys Pro Asn Val Thr Pro Thr Val
  1              5              10              15
```

```
Ala His Arg Thr Ser Ser Ser Arg Val Ala Val Arg Ser Leu Val Glu
      20              25              30
```

```
Phe Thr Cys Cys Arg Ala Gly Ala Leu Asp Trp Val Cys Ala Arg Arg
      35              40              45
```

```
Gly Arg Leu Pro Ser Gly Arg Asn Leu Glu Val Asp Val Ser Leu Ser
      50              55              60
```

Pro Arg His Val Gly Pro Arg Ala Gly Pro Gly Leu Ser Pro Gly Thr
 65 70 75 80
 Leu Gly Pro Ser Met Ala Met Arg Val Ala Gly Gly Arg Asp Gly Ser
 85 90 95
 Cys Leu Pro Val Ala Leu Gly Leu Ala Gly Ala Pro Gln Thr Pro Gly
 100 105 110
 Val Gly Arg Ala Ile Trp Val Arg Ser Ser Ile Pro Leu Arg Ala Ala
 115 120 125
 Ser Pro Thr Ser Trp Gly Thr Tyr Arg Ser Ser Ala Pro Leu Leu Glu
 130 135 140
 Ala Ala Pro Gly Pro Trp Arg Met Ala Ser Gly Phe Trp Lys Thr Ala
 145 150 155 160
 Thr Met Gln Gln Gly Thr Phe Leu Val Ala Leu Ser Leu Ser Ser Phe
 165 170 175
 Trp Pro Cys Ser Leu Ala Leu Cys Pro Leu Gln Pro Thr Lys Cys Ala
 180 185 190
 Ile Pro Arg Gly
 195

<210> 3
 <211> 13
 <212> PRT
 <213> Hepatitis C virus

<220>
 <221> Variant
 <222> 8
 <223> Xaa = Asn or Lys

<220>
 <221> Variant
 <222> 9
 <223> Xaa = Val or Glu

<220>
 <221> Variant
 <222> 13
 <223> Xaa = Ala or Val

<400> 3
 Leu Asn Leu Lys Glu Lys Pro Xaa Xaa Thr Pro Thr Xaa
 1 5 10

<210> 4
 <211> 13
 <212> PRT
 <213> Hepatitis C virus

<220>
 <221> Variant
 <222> 6

<223> Xaa = Leu or Ser

<220>

<221> Variant

<222> 10

<223> Xaa = Ala or Val

<220>

<221> Variant

<222> 11

<223> Xaa = Ala or Val

<400> 4

Ala Ala His Arg Thr Xaa Ser Ser Arg Xaa Xaa Val Arg
1 5 10

<210> 5

<211> 14

<212> PRT

<213> Hepatitis C virus

<400> 5

Leu Asn Leu Lys Glu Lys Pro Asn Val Thr Pro Thr Ala Cys
1 5 10

<210> 6

<211> 14

<212> PRT

<213> Hepatitis C virus

<400> 6

Ala Ala His Arg Thr Ser Ser Ser Arg Ala Val Val Arg Cys
1 5 10

<210> 7

<211> 18

<212> PRT

<213> Hepatitis C virus

<400> 7

Pro Thr Asp Pro Arg Arg Arg Ser Arg Asn Leu Gly Lys Val Ile Asp
1 5 10 15

Thr Cys

<210> 8

<211> 20

<212> PRT

<213> Hepatitis C virus

<400> 8

Gly Cys Ala Thr Arg Lys Thr Ser Glu Arg Ser Gln Pro Arg Gly Arg
1 5 10 15

Arg Ala Pro Ile
20

<210> 9
 <211> 195
 <212> PRT
 <213> Hepatitis C virus

<400> 9
 Ala Gln Ile Leu Asn Leu Lys Glu Lys Pro Asn Val Thr Pro Thr Ala
 1 5 10 15
 Ala His Arg Thr Leu Ser Ser Arg Val Ala Val Arg Ser Leu Ala Glu
 20 25 30
 Phe Thr Cys Cys Arg Ala Gly Ala Pro Asp Trp Val Cys Ala Arg Leu
 35 40 45
 Gly Arg Leu Pro Ser Gly Arg Ser Leu Val Glu Gly Ala Ser Leu Ser
 50 55 60
 Pro Arg Ile Ala Gly Pro Arg Ala Gly Pro Gly Leu Ser Pro Gly Thr
 65 70 75 80
 Leu Gly Pro Ser Met Ala Met Arg Val Ala Gly Gly Gln Asp Gly Ser
 85 90 95
 Cys Pro Pro Ala Ala Leu Gly Leu Leu Gly Ala Pro Met Thr Pro Gly
 100 105 110
 Gly Gly Pro Ala Ile Trp Val Arg Ser Ser Ile Pro Leu Arg Ala Ala
 115 120 125
 Ser Pro Thr Ser Trp Gly Thr Ser Arg Ser Ser Ala Pro Leu Gly Ala
 130 135 140
 Ser Pro Glu Leu Trp Arg Met Ala Ser Gly Ser Trp Arg Thr Gly Ile
 145 150 155 160
 Thr Gln Gln Gly Ile Phe Pro Val Ala Leu Phe Leu Ser Ser Phe Trp
 165 170 175
 Leu Phe Cys Pro Ala Leu Ser Gln Leu Arg Pro Ser Lys Cys Ala Thr
 180 185 190
 Leu Val Gly
 195

<210> 10
 <211> 196
 <212> PRT
 <213> Hepatitis C virus

<400> 10
 Ala Arg Ile Leu Asn Leu Lys Glu Lys Pro Asn Val Thr Pro Thr Val
 1 5 10 15
 Ala His Arg Thr Ser Ser Ser Arg Val Ala Val Arg Ser Leu Val Glu
 20 25 30
 Phe Thr Cys Cys Arg Ala Gly Ala Leu Asp Trp Val Cys Ala Arg Arg
 35 40 45
 Gly Arg Leu Pro Ser Gly Arg Asn Leu Glu Val Asp Val Ser Leu Ser
 50 55 60
 Pro Arg His Val Gly Pro Arg Ala Gly Pro Gly Leu Ser Pro Gly Thr
 65 70 75 80
 Leu Gly Pro Ser Met Ala Met Arg Val Ala Gly Gly Arg Asp Gly Ser
 85 90 95
 Cys Leu Pro Val Ala Leu Gly Leu Ala Gly Ala Pro Gln Thr Pro Gly
 100 105 110
 Val Gly Arg Ala Ile Trp Val Arg Ser Ser Ile Pro Leu Arg Ala Ala
 115 120 125
 Ser Pro Thr Ser Trp Gly Thr Tyr Arg Ser Ser Ala Pro Leu Leu Glu
 130 135 140
 Ala Ala Pro Gly Pro Trp Arg Met Ala Ser Gly Phe Trp Lys Thr Ala
 145 150 155 160
 Thr Met Gln Gln Gly Thr Phe Leu Val Ala Leu Ser Leu Ser Ser Phe

				165					170					175	
Trp	Pro	Cys	Ser	Leu	Ala	Leu	Cys	Pro	Leu	Gln	Pro	Thr	Lys	Cys	Ala
			180					185					190		
Ile	Pro	Arg	Gly												
			195												

<210> 11
 <211> 192
 <212> PRT
 <213> Hepatitis C virus

<400> 11

Ala	His	Phe	Leu	Asn	Leu	Lys	Glu	Lys	Pro	Lys	Glu	Thr	Pro	Ser	Val
1				5					10					15	
Ala	His	Arg	Thr	Ser	Ser	Ser	Arg	Val	Ala	Asp	Arg	Ser	Leu	Val	Glu
			20					25					30		
Tyr	Thr	Cys	Cys	Arg	Ala	Gly	Ala	His	Asp	Trp	Val	Cys	Ala	Arg	Arg
		35				40						45			
Val	Lys	Leu	Leu	Asn	Gly	His	Ser	Leu	Ala	Asp	Asp	Ser	Leu	Ser	
	50					55					60				
Pro	Arg	Arg	Val	Gly	Ala	Lys	Ala	Gly	Pro	Gly	Leu	Ser	Pro	Gly	Thr
65				70					75					80	
Leu	Gly	Pro	Ser	Met	Val	Thr	Arg	Ala	Ala	Gly	Gln	Gly	Gly	Gly	Ser
				85					90					95	
Cys	Pro	His	Ala	Ala	Pro	Val	His	Pro	Gly	Ala	Gln	Met	Thr	Pro	Gly
			100					105					110		
Gly	Gly	Pro	Ala	Ile	Trp	Val	Lys	Ser	Ser	Ile	Pro	Arg	Ala	Asp	Ser
			115				120					125			
Pro	Thr	Ser	Trp	Gly	Thr	Ser	Arg	Gly	Gly	Ala	Leu	Leu	Glu	Ala	Ser
			130			135					140				
Gln	Glu	Pro	Ser	Arg	Met	Ala	Gly	Pro	Leu	Lys	Thr	Gly	Ile	Ser	Gln
145					150					155					160
Gln	Gly	Thr	Cys	Pro	Val	Ala	Pro	Phe	Leu	Ser	Ser	Phe	Leu	Leu	Cys
			165					170					175		
Ser	Leu	Ala	Phe	Ile	Gln	Gln	Pro	Val	Ser	Gly	Gly	Ile	Arg	Leu	Ala
			180					185					190		

<210> 12
 <211> 197
 <212> PRT
 <213> Hepatitis C virus

<400> 12

Ala	Gln	Ile	Leu	Asn	Leu	Lys	Glu	Lys	Pro	Lys	Glu	Thr	Gln	Thr	Ala
1				5					10					15	
Ala	His	Arg	Thr	Leu	Ser	Ser	Arg	Val	Ala	Val	Arg	Ser	Leu	Ala	Glu
			20					25					30		
Phe	Thr	Cys	Cys	Arg	Ala	Gly	Ala	Pro	Gly	Trp	Val	Cys	Ala	Arg	Gln
		35				40						45			
Gly	Arg	Leu	Leu	Ser	Asp	Pro	Ser	Arg	Val	Asp	Asp	Ala	Ser	Pro	Ser
	50					55					60				
Arg	Lys	Ile	Gly	Ala	Pro	Pro	Ala	Ser	Pro	Gly	Glu	Ser	Gln	Asp	Ile
65				70					75					80	
Leu	Gly	Pro	Cys	Thr	Glu	Thr	Arg	Val	Ala	Ala	Gly	Arg	Val	Gly	Ser
				85					90					95	
Cys	Pro	Pro	Ala	Gly	Leu	Val	Leu	Leu	Gly	Ala	Pro	Pro	Thr	Pro	Gly
			100					105					110		
Ile	Asp	His	Ala	Ile	Trp	Ala	Glu	Ser	Ser	Ile	Pro	Leu	Arg	Val	Val
			115				120					125			

Leu Pro Thr Ser Trp Gly Thr Ser Leu Ser Leu Ala Pro Arg Leu Glu
 130 135 140
 Ala Ser Pro Glu Leu Trp His Thr Val Leu Gly Ser Trp Arg Thr Gly
 145 150 155 160
 Ile Thr Gln Gln Gly Ile Tyr Pro Val Ala Leu Phe Leu Ser Phe Cys
 165 170 175
 Leu Leu Phe Cys His Ala Ser Gln Cys Gln Cys Leu Gln Trp Lys Ser
 180 185 190
 Gly Thr Leu Val Leu
 195

<210> 13
 <211> 195
 <212> PRT
 <213> Hepatitis C virus

<400> 13
 Ala Arg Ile Leu Asn Leu Lys Glu Lys Pro Asn Val Thr Pro Thr Ala
 1 5 10 15
 Ala His Arg Thr Leu Ser Ser Arg Val Ala Ala Arg Ser Leu Ala Glu
 20 25 30
 Phe Thr Cys Cys Arg Ala Gly Ala Pro Glu Trp Val Cys Ala Arg Arg
 35 40 45
 Gly Arg Leu Pro Ser Gly Arg Asn Leu Ala Gly Gly Val Ser Leu Phe
 50 55 60
 Pro Arg Pro Ala Asp Pro Arg Glu Gly Pro Gly Arg Ser Pro Gly Thr
 65 70 75 80
 Leu Gly Pro Ser Met Ala Thr Arg Ala Val Gly Gly Arg Asp Pro Ser
 85 90 95
 Cys Pro Pro Ala Ala Leu Gly Leu Val Gly Ala Leu Leu Thr Pro Gly
 100 105 110
 Gly Gly His Ala Ile Trp Val Arg Ser Ser Ile Pro Ser Arg Val Ala
 115 120 125
 Ser Pro Thr Ser Trp Gly Thr Ser Thr Ser Ser Ala Leu Leu Gly Ala
 130 135 140
 Leu Pro Glu Leu Trp His Met Val Leu Glu Ser Trp Lys Thr Ala Ile
 145 150 155 160
 Thr Gln Gln Gly Thr Ser Pro Val Ala Leu Phe Leu Ser Ser Cys Ser
 165 170 175
 Leu Phe Tyr Pro Ala Gln Ser Leu Leu Arg Pro Ser Glu Cys Ala Thr
 180 185 190
 Leu Arg Gly
 195

<210> 14
 <211> 194
 <212> PRT
 <213> Hepatitis C virus

<400> 14
 Ala Gln Ile Leu Asn Leu Lys Glu Lys Pro Lys Glu Thr Pro Thr Val
 1 5 10 15
 Ala His Lys Thr Leu Ser Phe Arg Ala Ala Ala Arg Ser Leu Ala Glu
 20 25 30
 Tyr Thr Cys Cys Arg Ala Gly Ala Pro Gly Trp Val Cys Ala Arg Gln
 35 40 45
 Gly Arg Leu Arg Ser Gly Pro Ser His Val Glu Gly Ala Ser Pro Ser
 50 55 60
 Leu Arg Ile Gly Ala Pro Leu Ala Asn Pro Gly Glu Asn Gln Asp Thr

```

65          70          75          80
Pro Gly Pro Tyr Thr Gly Met Arg Asp Ser Ala Gly Gln Asp Arg Ser
      85          90          95
Cys Pro Pro Glu Val Pro Val Pro Leu Gly Ala Pro Met Thr Pro Gly
      100        105        110
Ile Gly Pro Ala Thr Trp Val Arg Ser Ser Ile Pro Arg Ala Ala Leu
      115        120        125
Pro Thr Ser Trp Gly Thr Ser Leu Ser Ala Pro Arg Ser Ala Ala Ser
      130        135        140
Pro Glu Leu Ser Arg Met Ala Glu Ser Trp Arg Thr Gly Leu Ile Leu
145          150        155        160
Gln Gln Gly Thr Tyr Pro Val Ala Pro Phe Leu Ser Ser Cys Trp Pro
      165        170        175
Cys Cys Pro Ala Ser Pro Pro Arg Ser Pro Leu Pro Lys Arg Thr Ser
      180        185        190
Val Pro

```

```

<210> 15
<211> 194
<212> PRT
<213> Hepatitis C virus

```

```

<400> 15
Ala Gln Ile Gln Asn Pro Lys Asp Lys Pro Lys Glu Thr Pro Thr Val
 1          5          10          15
Ala His Arg Thr Ser Ser Ser Arg Ala Val Val Arg Ser Trp Val Glu
      20        25        30
Tyr Thr Cys Cys Arg Ala Gly Ala Leu Asp Trp Val Cys Ala Arg Leu
      35        40        45
Gly Arg Leu Pro Asn Gly Pro Ser Pro Glu Ala Gly Val Ser Pro Phe
      50        55        60
Gln Arg Leu Ala Ala Arg Arg Ala Val Pro Gly Val Ser Leu Gly Thr
      65        70        75        80
His Gly Pro Cys Met Gly Met Arg Ala Ala Gly Gly Gln Gly Gly Ser
      85        90        95
Cys Pro Pro Ala Ala Leu Ala Gln Arg Gly Ala Gln Thr Thr Pro Gly
      100       105       110
Val Gly Leu Ala Thr Trp Val Arg Ser Ser Ile Pro Leu Leu Ala Ala
      115       120       125
Ser Pro Thr Trp Gly Thr Ser Pro Ser Ala Ala Pro Gly Ala Ser Gln
      130       135       140
Gln Gln Leu Trp Arg Met Ala Ser Gly Leu Leu Arg Thr Gly Ile Met
145          150        155        160
Gln Gln Gly Ile Phe Pro Val Ala Pro Phe Leu Ser Ser Phe Trp His
      165        170        175
Phe Phe Arg Ala Leu Tyr Gln Pro Arg Gln Ser Ile Met Pro Ile Arg
      180        185        190
Ala Ala

```

```

<210> 16
<211> 195
<212> PRT
<213> Hepatitis C virus

```

```

<400> 16
Ala Arg Ile Leu Asn Leu Lys Glu Lys Pro Asn Val Thr Pro Thr Ala
 1          5          10          15

```

Ala Gln Trp Thr Leu Ser Ser Arg Val Val Ala Arg Ser Leu Ala Glu
 20 25 30
 Phe Thr Cys Cys Arg Ala Gly Ala Pro Asp Trp Val Cys Ala Arg Leu
 35 40 45
 Gly Arg Leu Arg Ser Gly Arg Asn Leu Val Glu Asp Ala Asn Leu Ser
 50 55 60
 Pro Arg Arg Val Asp Pro Arg Glu Gly Pro Gly His Asn Gln Asp Ile
 65 70 75 80
 His Gly Leu Phe Thr Val Met Arg Val Val Gly Gly Gln Asp Gly Ser
 85 90 95
 Cys Pro Pro Val Ala Leu Asp Arg Leu Gly Ala Gln Met Ile Pro Ala
 100 105 110
 Gly Gly Pro Ala Ile Trp Val Arg Ser Ser Ile Pro Pro Ala Ala Ser
 115 120 125
 Pro Thr Ser Trp Asp Thr Ser Arg Ser Ala Pro Pro Trp Val Ala Ser
 130 135 140
 Pro Gly Pro Trp His Met Val Ser Gly Leu Trp Arg Thr Gly Ser Ile
 145 150 155 160
 Met Gln Gln Gly Ile Ser Pro Val Ala Pro Phe Leu Ser Ser Ser Trp
 165 170 175
 His Phe Phe Arg Ala Leu Ser Pro Leu Arg Pro Leu Thr Ile Ala Met
 180 185 190
 Ser Gln Ala
 195

<210> 17

<211> 192

<212> PRT

<213> Hepatitis C virus

<400> 17

Ala Gln Ile Leu Asn Leu Lys Glu Lys Pro Asn Val Thr Pro Thr Ala
 1 5 10 15
 Ala His Arg Thr Ser Ser Ser Arg Ala Val Val Arg Ser Leu Val Glu
 20 25 30
 Phe Thr Cys Cys Arg Ala Gly Ala Pro Gly Trp Val Cys Ala Arg Leu
 35 40 45
 Gly Arg Leu Pro Ser Gly Arg Asn Leu Val Glu Gly Asp Asn Leu Ser
 50 55 60
 Pro Arg Phe Ala Gly Pro Arg Ala Gly Pro Gly Leu Ser Pro Gly Thr
 65 70 75 80
 Leu Gly Pro Ser Met Ala Met Arg Val Trp Gly Gly Gln Asp Gly Ser
 85 90 95
 Cys His Pro Gly Ala Leu Gly Leu Val Gly Ala Pro Arg Thr Pro Gly
 100 105 110
 Val Gly Arg Val Ile Trp Val Arg Ser Ser Ile Pro Leu His Ala Gly
 115 120 125
 Ser Pro Thr Ser Trp Gly Thr Phe Pro Ser Ala Ala Pro Gly Ala Leu
 130 135 140
 Pro Gly Pro Trp Arg Met Val Ser Gly Phe Trp Arg Ser Ala Thr Thr
 145 150 155 160
 Gln Gln Gly Phe Pro Val Ala Leu Ser Leu Ser Ser Ser Pro Cys Cys
 165 170 175
 Pro Val Pro Phe Gln Leu Pro Leu Met Lys Cys Ala Thr Cys Pro Gly
 180 185 190